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ABSTRACT

In this discussion of reform and improvement in teacher education, the feasibility of developing a scientist-practitioner model for teacher education programs is considered. This model advocates the development of research skills through a programmatic focus on research, with the application of these skills to practice. It is pointed out that the development of research skills in teachers would serve to enhance their abilities in critical thinking and problem solving. Additionally, the status of education would receive a substantial lift with the development of a strong research base that would serve as a means to develop a common core of professional knowledge. To test the possibility of implementing a scientist-practitioner model at the undergraduate level, a course in educational research was designed for preservice teachers. Six senior female undergraduate students participated in this course, which focused on the development of critical thinking and decision making skills by actively involving the students in conducting and evaluating educational research. A description is given of the course design and the procedure used to evaluate its effectiveness. A discussion is presented of the results, which indicated that the course participants made more elaborated reflections and acted-upon decisions more than those who did not take the course. (JD)

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Preservice Teacher Education: Research on the
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an Undergraduate Program

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Preservice Teacher Education: Research on the
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The reform movement in teacher education, developing for at least the past decade, has recently experienced a resurgence. With the publication of the Carnegie Forum's (1986) "A Nation Prepared: Teachers for the 21st Century" and the Holmes Group's (1986) "Tomorrow's Teachers", the educational reform movement has pushed the issue of teacher quality to center stage in the debate on the improvement of elementary and secondary schools. This reform movement has the potential to dramatically change the training of teachers as professionals. We must therefore be cognizant of the various issues being addressed within this movement and be cautious about accepting recommendations for change without critical evaluation.

The forementioned reports recommend that teacher education programs begin with four years of a strong liberal arts curriculum, adding a fifth-year program of professional teacher training. The additional training year would emphasize a strong theoretical/research base and include highly structured clinical activities. Many current teacher training programs, particularly those at the undergraduate level, focus on the teaching of practical skills useful to a classroom teacher and de-emphasize the theoretical and methodological bases for teacher practice. Current training models which emphasize practical knowledge rather than theoretical knowledge may have minimal impact on a teacher's behaviors in a classroom. Without a balance between application and systematic study of the knowledge base underlying educational practice, teachers may lack the skills necessary to become

competent professionals in their fields (Spencer & Boyd, 1977). Lortie (1975) argues that, due to the applied nature of educational methods courses, preservice teachers learn little to enhance the development of their theoretical views of teaching practice. It has been found that teachers frequently use a mixture of practical experience, hunches, and theory to make decisions about the education of children (Smith, 1980). Smith points out that current teaching practices encourage teacher decision-making based upon these hunches, frequently with little reference to systematic, objective, problem solving. Rudduck (1985) claims that teachers believe research has little relevance to practice. Yet, the current reform movement suggests that a professional educator must look to pedagogy to support classroom practices. Spencer and Boyd (1977) argue that the way teachers engage in problem solving may delineate the fundamental difference between a professional educator and an educated person who teaches.

The teacher-practitioner model, used for many years in teacher education, may not be the most appropriate model for training professional teachers. Although much work is needed to identify factors most likely to improve teacher training programs, and to determine the effectiveness of teacher education courses (Zeichner, 1981), it is imperative that teacher educators accept responsibility for educational reform and provide the leadership for constructive change.

The current state of affairs in teacher education is reminiscent of the 1950's reform movement in the training of clinical

psychologists. Out of the Boulder Conference (Raimy, 1950) came the proposition to train psychologists as both scientists and practitioners. As with the teacher education reform initiatives, the reform movement in the training of psychologists encouraged a strong liberal arts basis at the undergraduate level and recommended that the development of knowledge, skills, attitudes and values as a professional psychologist be undertaken at the graduate level.

Recommendations for training in psychology focused on the following:

- a) the establishment of a progressive, structured, sequenced program, with a strong theoretical basis; b) the strengthening of methodology, interpretation, and skills in the application of that knowledge; c) the enhancement of supervised structured clinical experiences; and d) the progression of clinical responsibility to parallel student level of expertise.

A strong component of the training program stressed the importance of the development of research skills for all psychologists. This component completed the formation of a new model for training psychologists--the scientist-practitioner model. The scientist-practitioner model advocates the development of research skills through a programmatic focus on research, with the application of these skills to practice. It appears that teacher education may be at a similar point in its professional development.

Programmatic changes in the training of teachers are necessary for the profession to improve its stature among other professions. Recommendations to move the emphasis to the graduate level (Holmes, 1986; Carnegie, 1986) suggest the notion that teacher education should

be left to those institutions with a strong research focus. A commitment to the scientist-practitioner model for teacher education would indeed require a fundamental shift in attitude, context, expectation, and relationships (Rudduck, 1985).

Many teacher educators pay little attention to the results of research on teaching and education in their training of pre-service teachers (Griffin, 1984; Smith, 1980). Griffin (1984) claims that even when research is used in pre-service training, it is often used as justification for practices taught by the teacher educator rather than to encourage pre-service teachers to question, search, and interpret research for professional development.

In response to this criticism, teacher educators cite a lack of a strong research base in the field of education. They argue that research methodologies in the field of education are immature, limiting the amount of quality research available for use in teaching (Champion, 1984) and that the results of research conducted by universities are frequently inaccessible, not available in forms that are easily communicated directly to practitioners (Rudduck, 1985). Smith (1980) argues that much of the problem lies not in the lack of research, but in the organization of existent research into a core of knowledge common across the profession. Collaboration between researchers and practitioners is crucial for the successful infusion of research findings into the general practice of teaching (Householder, 1985; Rudduck, 1985). Such a relationship would allow for the development of this common knowledge base in education.

Many of the forementioned problems are currently being addressed. The teaching effectiveness research conducted over the past decade has incorporated improved methodologies for the development of a common core of professional knowledge in the field of education. Attention has also been given to the dissemination of research results, for the improvement of information delivery into the hands of educators. The evolution of these practices in educational research may take time, however. Gage (1978) identifies this process as one similar to the 60-year penicillin stage of evolution in the field of medicine. Although research long supported its effectiveness, much time elapsed before its use was widespread. Developing a scientific basis for the art of teaching, as coined by Gage (1978) does, however, appear to be on its way.

Even so, the degree to which research should be emphasized in pre-service teacher training continues to be debated. The notion of the integration of the scientist-practitioner model into teacher education appears threatening to some (Bissex, 1986). Teacher educators still struggle, as did participants of the Boulder conference, with the relative importance of the liberal arts, practical experience in teaching, and pedagogy (Gage, 1978). Gage argues that this struggle, which creates problems in teacher training, is due to the lack of a scientific basis. With such a basis, Gage believes that we could better determine what is worth learning in a teacher education program (Gage, 1978).

Several advantages to the use of the scientist-practitioner model should be considered. First, it would appear that the development of

research skills in teachers would serve to enhance their abilities in critical thinking and problem solving. Additionally, the status of education would receive a substantial boost with the development of a strong research base that would serve as a means to develop a common core of professional knowledge. The hope for the reform of teacher education may lie in redirecting the focus of teacher training - a movement toward, as in the field of psychology, a scientist-practitioner model. This model encourages the development of teachers as researchers and allows for the application of a common knowledge base to the practice of teaching.

Although the acceptance of this model would require an overhauling of current beliefs and practices at both the undergraduate and graduate levels, incorporating research into teacher education programs should have advantages which would outweigh its possible disadvantages. The use of research in pre-service teacher education programs may promote the development of skills in questioning, critical thinking, and reflection. Training in research should enhance the acquisition of critical analysis skills for teachers and allow them to make informed judgments in their teaching (Griffin, 1984). The use of research can offer teachers a way of structuring familiar situations to systematically explore and gain insights into the education of children (Rudduck, 1985). It allows teachers to develop new methodologies and encourages systematic inquiry into the appropriateness of these methodologies for effective teaching (Roth and Adler, 1985). The integration of research into the classroom promotes the image that schools are professional workplaces (Griffin,

1984), conscious of the need to adjust and adapt curriculum and pedagogy to a changing environment.

Currently, the Holmes group is also addressing the need to integrate theory and practice, and supports both a strong liberal arts background and the development of a solid research base to provide a common core of knowledge. One way to achieve improvement in teacher education, according to the Holmes group, is through the development of a fifth year, or graduate program, in teacher training. Although the development of a fifth year program may provide a solution for effective teacher training, complete resolution lies in the revision of the content of teacher education curricula.

Teacher education appears to be at a turning point in its evolution in this country. An opportunity to guarantee the training of teachers as scientists and practitioners may be lost if the debate centers around the issue of teacher education being more appropriate at the undergraduate or graduate level. Instead, emphasis for reform should be placed on the development of quality programs which are based on theoretical models and focus on the integration of research with teaching and learning. Undergraduate programs must also look to future trends in teacher education in order to be better prepared to meet the challenges of ensuring the development of teachers who are scholars and researchers as well as practitioners. The scientist-practitioner model seems appropriate for both undergraduate and graduate training programs in teacher education.

In interviews with teacher educators concerning the integration of research into undergraduate teacher education programs, Champion

(1984) found that, although teacher educators mentioned research in lectures 97% of the time, research was only modelled about 37% of the time and used class demonstrations only 27% of the time. Adoption of the scientist-practitioner model will mean that the skill development of future teachers will not come about through the passive, lecture format. Rather, this model dictates that students need to be actively involved in the research process so as to become more adequately skilled in critical thinking, analysis, and problem solving. Preservice teachers must understand how to interpret research in order to more appropriately use research in their classes.

It may be difficult to integrate a strong research emphasis into teacher training programs without the cooperation and enthusiasm of teacher educators. The attitudes of teacher educators seem a necessary, fundamental change before this model can be integrated into a preservice teacher education program. Many teacher educators come from programs without strong research orientations, especially when compared with other professions (Rudduck, 1985), and thus, especially at the undergraduate level, do not see research as having any more or less value than anything else (Champion, 1984). A change in this attitude is of course essential before teacher educators accept the systematic integration of the scientist-practitioner model into pre-service programs. Educators in four-year teacher training programs should be willing to adapt to changes proposed by the Holmes group and others. By building a strong research base, and developing teachers who think critically and are capable of analyzing classroom

practice within the framework of research, the professional practice of teaching may be enhanced.

In order to test the feasibility of implementing the scientist-practitioner model at the undergraduate level, a course in educational research was designed for pre-service teachers. This course focused on the development of critical thinking and decision-making skills by actively involving students in conducting and evaluating educational research. The intent of this course was to familiarize students with research design and statistical analysis for the critical evaluation of reported research. In addition to analyzing current research in education, the students collectively conducted a study to answer a question of common interest. One of the outcomes of the course was to foster pre-service teachers' willingness to conduct applied research in practice that would support decisions made when dealing with their own students in the future.

The present study was an outgrowth of the undergraduate educational research course. Its purpose was to investigate the resultant decision-making skills of those pre-service teachers who had participated in this course.

Method

Subjects

The subjects for this study included six senior female undergraduate students from a small, midwestern liberal arts college. All had fulfilled course requirements for teacher certification and were enrolled in their final term of student teaching experience. Three of these students had successfully completed the educational

research course (Research group). The remaining three students had not taken this course (No Research group). The mean grade point average (GPA) of students who had enrolled in and completed the educational research course ($n=3$) was 3.43 and for those who had not enrolled in the course ($n=3$) was 3.36. All students had fulfilled their field experience requirements. None of their previous field experience settings were identical to those employed in student teaching. For all of the subjects, student teaching took place in regular classroom settings in an urban school district. School-age students attending the schools in which the student teachers were placed came from similar socioeconomic backgrounds. All student teachers participated in 40 student teaching days.

Design and Procedure.

All student teachers were asked to keep daily journals in which they reported on decisions made while student teaching and the process undergone in coming to those particular decisions. Students were instructed to make at least daily entries, but were given no guidelines regarding type, length, or the possibility of multiple entries.

The journals were analyzed ex post facto by two independent raters (who were experienced teachers) for content and evidence of the decision-making process. Raters segmented journal entries into what they considered to be individual thought units or topics. After a consensus was reached regarding segmentation of journal entries raters independently evaluated individual units. Descriptions of student teachers' direct participation in activities which included a

statement that indicated decision-making (e.g., "I decided that...", "I made sure that...") were coded as Decisions. Descriptions of student teacher observations of the classroom environment, or their reflections on previous decisions were coded as Reflective Observations. In addition, units were coded as being Elaborated if, for Decisions, they included a description of follow-through of the decision, and, if for Reflective Observations, they included evidence of the reasoning behind the observation. Units were coded as being: Academic, related specifically to teaching/learning issues; Social, concerning student attitude and behavior; and Other, dealing with general comments and thoughts about school climate, interpersonal conversation or student teacher personal learning.

Inter-rater reliability for both the total number of identified entries and the agreement of entry units within each category was calculated. The inter-rater reliability for the journal coding was .88.

Results

Data were analyzed using the Mann Whitney U test for normal approximation with tie correction. Significant differences between groups were found for the total number of elaborated responses ($z = -1.96$, $p < .05$) despite the groups' similarity in mean number of daily coded units ($M = 1.7$, Research; $M = 1.6$, No Research). Students completing the research course elaborated on 94% of their responses (191 out of 204), whereas students not completing the research course elaborated on 43% of their responses (79 out of 185).

When the two groups were compared on Reflective Observations, the following differences were noted. In the Academic category, students having the research training made significantly more Elaborated Reflective Observations ($n=52$) than did the students without the research training ($n=17$), $z = -1.99$, $p < .05$. On the other hand, the No Research group made significantly more nonelaborated Reflective Observations ($n=23$) than did the Research group ($n=2$), $z = -1.96$, $p < .05$. In the Social category, students completing the research course had significantly fewer Reflective Observations ($n=3$) than did the students not completing the course ($n=30$), $z = -1.96$, $p < .05$. Furthermore, the students without research training also had significantly more entries ($n=44$) in the Other category than did the students with research training ($n=15$), $z = -2.02$, $p < .05$. Although the two groups were quite similar in the total number of Reflective Observations made ($n=95$, Research; $n=123$, No Research), the Research students had significantly fewer non-elaborated responses than did the No Research group, $z = -1.96$, $p < .05$. When the students with research training wrote a reflective observation, they were more likely to elaborate on their comments (See Table 1).

Significant differences were found between groups for the total number of Decisions. The students with research identified significantly more Decisions ($n=109$) than those without research ($n=62$), $z = -1.99$, $p < .05$. In addition, the Research group had significantly more Elaborated Decisions ($n=101$) than did the No Research group ($n=43$), $z = -1.96$, $p < .05$. For those items coded

Elaborated Academic Decisions, the Research group had significantly more ($n=81$) than did the No Research group ($n=22$), $z = 1.99$, $p < .05$.

Discussion

The results indicate that those students having taken the research course made more elaborated reflections and acted-upon decisions than those students who did not take the course. Moreover, the journal entries of those students taking the Research course had similar profiles which included an initial reflection, followed by a decision with action, and concluded with an elaborated reflection on the result of the decision. This pattern of response was not apparent among the students not taking the research course.

The Research students tended to focus more on academic and teaching related reflections and decisions than did the No Research group. The identification of a social/behavioral problem by the Research group was frequently followed by a decision in the academic realm. This seems to reflect the notion that apparent social issues are often the result of inappropriate teaching methodologies and/or expectations regarding academic tasks. While the No Research group was able to identify social/behavioral difficulties in the classroom, their decisions made were based solely on these behavioral concerns and did not reflect an understanding of the relationship between academics and affect.

The types of academic entries by the Research group were of a different nature than those of the Nonresearch group. Students completing the research course focused on more complex academic concerns than did those not completing this course. The Research

students reflected and made decisions more often concerning specific teaching behaviors, relating to specific student problems. Several perspectives regarding the source of specific problems were considered before decisions were made. On the other hand, the No Research group tended instead to make simple comments, with little elaboration or evidence of thinking through possibilities or solutions.

Students completing the research course frequently mentioned research and previous learning to support their decisions in the classroom. Although there was little difference in the two groups between GPA and courses in education, the differences related to the research course are apparent. The results of this study provide support for the notion that training teachers through a model which encourages research, such as the scientist-practitioner model, may enable them to reflect on their teaching, and to use their reflections to make informed decisions in the classroom.

Although these results are based on a small sample, the notable differences warrant further research. It would be useful to study specific aspects of decision-making and reflection in order to better understand the qualitative differences between students taking a research approach to teaching and those not. On a more general level, the present study serves to support the notion that training of teachers in a scientist-practitioner model will result in improved classroom decisions.

However, as can be seen by this project, the scientist-practitioner model need not be an approach reserved for graduate level programs, but is one appropriate for undergraduate

programs as well. This model is not designed to make "researchers" out of undergraduate teacher education students. It is instead designed to work toward educating teachers to be thinkers, reflectors and decision-makers. This model can help teachers learn to make decisions based upon research, rather than instinct.

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Table 1

Frequency of Reflective Observations and Decisions by Student Teachers with and Without Research Training.

Group	n	Reflective Observations						Decisions					
		A	S	O	A+	S+	T	A	S	O	A+	S+	T
Research	3	2	3	15	52	23	95	6	0	2	81	20	109
No Research	3	23	30	44	17	9	123	10	2	7	22	21	62

Note. A=Academic; S=Social; O=Other; A+=Elaborated Academic; S+=Elaborated Social; T=Total.